A Novel Approach for Eye Tracking using Driver Fatigue Monitoring

Ms. Neha Bhalerao, Ms. Snehal S. Sawant, Ms. Dipali C. Pathade, Ms. Vandana S. Singh, Prof. K. S. Kumavat

BE ,Computer Dept. of Computer BVCOERI, Nashik, India

Abstract— *System describes a real-time online trial product driver-fatigue monitor or driver tiredness is captured. It means to capture the current state or mode of tiredness of driver whether the driver is in sleeping state or in wakening state. It uses remotely located charge-coupled-device cameras able to with active infrared illumination to acquire video images of the driver. Various cues that typically stated the level of attentiveness of a person that how an person is attentive are removed or take out in real time and systematic combined to infer the tiredness level of the driver. The some cues employed stated eyelid movement, steady movement, head movement, and facial expression. This is developed to model human fatigue and to know about fatigue based on the visual cues obtained. The simultaneous use of multiple optical cues and their methodical combination yields a much more robust and accurate fatigue categorization than using a single visual cue. This system was valid as real-life fatigue conditions with human subjects of different cultural backgrounds, genders, and ages as with or without glasses, and under different illumination conditions. It was found to be sensibly robust, reliable, and accurate in fatigue categorization.*

General Terms— *Pattern recognition: - This system will detect a driver fatigue by processing of eye region. After image acquisition, face captured detect is the first stage of processing. Then symptoms of hypo-vigilance are extracted from the eyes.*

Security— This system will detect a driver fatigue by processing of eye region.

Keywords— Fatigue detection, Driver Performance, driver Safety, Driver Monitoring System, Camera, Vibrator, Buzzer, Power Supply, micro controller series ,max 232,RED LED ,Green Led ,RF Transceiver.

I. INTRODUCTION

The main idea behind this system is to develop a non disturbing system which can detect tiredness of the driver and issue a timely word of warning. Since a large number of road accidents occur due to the driver sleepiness. So this system is for security of driver to help in prevent of driver. Hence this system will be helpful in preventing many accidents, and accordingly save money and reduce personal suffering. This system will monitoring or captured the current position of the driver's eyes using camera and by developing an algorithm we can detect symptoms of driver fatigue or tiredness early enough to avoid accident. So this system will be helpful in detecting driver tiredness in advance and will gave caution output in form of sound and seat belt shaking whose frequency will vary between 100 to 300 Hz's. Moreover the warning will be deactivate manually rather than automatically. So for this purpose a deactivation key will be used to deactivate warning. Moreover if driver felt sleepy there is possibility of unexpected speeding up or deceleration hence we can reviewer this by intrigues a graph in time domain and when all the three input variables shows a opportunity of fatigue at one moment then a alert signal is given in form of text or red color circle. This will directly give a suggestion of drowsiness/weakness which can be further used as record of driver performance. The green color circle will state that driver is in wake state.

The main focus is on the detection of micro-sleep symptoms. This is achieved by monitoring the eyes of the driver throughout the entire video sequence. The three phases involved in order to achieve this are the following:

1) Localization of the face,
2) Tracking of eyes in each frame, and
3) Detection of failure of tracking.

II. LITERATURE SURVEY

The main motive of this system is to develop android application which detects driver tiredness and give security alert to driver. By analyzing some facial look it is possible to detect that driver falling sleeping. Increased forehead lines, Eyelids moment, as well as cavernous moment are the facial expression which can be consider as early signs of tiredness In this way signs of drowsiness will help to give much more correct characterization of tiredness state than using single symptom of fatigue.

Most of the automobile accidents are caused by distracted driving. Monitoring or capturing driver's eyes can help in detecting current state of mind and alertness

of driver can be increase and thus can reduce the accidents.

Proposed system includes three main parts they are:-

1) Facial feature tracking.

2) Eye steady and 3-Dimentional head pose estimation

3) Eyes off the road and sleepiness detection. Video feed from camera installed on car control panel tracks features of driver in real time.

Infrared illumination is used at night time to detect facial features clearly without harming driver. Image processing algorithm is developed. It is possible to train and classify different combinations of steady and head pose angles to determine exact point of steady. Based on algorithm output if driver eyes are on the road eyes are closed due to tiredness or illness then according audio and staring vibration alertness are given to driver as fast as possible to make alert.

Micro sleeps that are short time of sleeps lasting 2 to 3 seconds are good indication of state. Triedstate. Thus by continuously capturing the eyes of the driver by using camera one can remove the sleepy state of driver and timely warning is given inform of sensor. Aim of the system is too been use the hardware which is very advanced related to driver safety on the roads using controller and monitoring.

This product removes driver tiredness and gives warning in form of buzzer or alarm and decreases the speed of vehicle. Also with the drowsiness is removed there is continuous capturing mode of the distance done by the Ultrasonic sensor. The ultrasonic sensor removes the obstacle and accordingly warns the driver to alert by buzzer as well as decreases speed of vehicle.

In automobile industries, an protocol can is essentially used for communication .This approach also aims to provide driver tiredness based on the character of the driver-vehicle interaction. The development of advanced driver support systems supports the driver in safe and comfortable and economic driving are of importance to the automotive industry. The system is able to monitor tiredness and alcohol with the help of sensors having a buzzer by that noise the driver can minimize road accidents.

The security is very significant in the automotive industry and it would be a strong proposition to have an improve safety feature that would prevent the driver from sleep while driving. With the aid of today's technology, photograph equipment can be used to know when the driver's eye lid have to mantle and Pupil are no longer defined. An unbalanced impeller is a rotor use to increase or decrease the pressure and flow of fluid could be utilized to receive the output data signal talented from the microcontroller, which is wired to the data input of the rotor. The signal input will activate the impellers means a rotor to device tremble the seat. Therefore, the driver is warns of the situation. This process can again continue to be implementing until the eyes are as opened again. This will be essential when as for about safety and will decrease the rate of accidents due to the lack of contemplation

The main idea behind this system is to develop a data accessing system which can detect tiredness of the driver and issue a keep it alert. Since a large number of road accidents occur due to the driver tiredness. Hence this system will be helpful to give alert signal in many accidents, and save money and reduce personal suffering. This system will captured the driver movements of eyes using camera and by developed an algorithm we can remove symptoms of driver tiredness early enough to avoid accident. So system will be helpful in detecting or removing driver tiredness in advance and will be give alertness signal as output in form of sound and vibrator belt whose will vary between 100 to 300 Hz's. Moreover the warning will be deactivated rather than automatically. So for this purpose a deactivation switch will be used to removing warning.

The input to the system are images from a video camera mounted in front of the car, which then analyzes each frame to detect the face region. The face is detected by searching for skin color-like pixels in the image.

III. CONCEPT

Captured or monitored by a camera, the movements of eyes are continuously captured by a camera. Because of this we can detect tiredness or a lack of energy state of driver. Short sleeps are because of tiredness or a micro sleeps means lose of attention and head snapping prolonged eye closure which occurred because of tiredness this can also be detected which are the main causes of accidents. Fatigue is a non-specific symptom, which means that it has many possible causes and has many different conditions. An eye tracker is a device for measuring eye positions and eye movement. In addition micro sleeps that are short period of sleeps lasting 2 to 3 seconds are good indicator of fatigue state.

Thus by continuously monitoring or captured the movements of eyes the eyes of the driver one can detect the sleepy state of driver because of a system having a sensor by which the driver can alert, also the system having an alarm which helps a driver to wake in this system the vibrations are also important by which the driver can be alert and this reduces the accidents after alerting the driver this all systems manually switched off.

This system will detect a driver fatigue by processing of eye region. After image acquisition, face detection is the first stage of processing.

In this method, horizontal system of top half-segment of facial image is used to remove symptoms of fatigue which is caused because of tiredness.

As eye closure and eyelid distance changes during time are used for fatigue detection.

If eyes are closed normally no warning is issued but when the eyes are closed for more than half second only because the particular time are adjusted so the impotent thing of this system issues warning to the driver in form of alarm and vibration.

3.1. System Requirement is as follow:-

1. Vibrator
2. vibratos Driver Ic ULN 2803
3. Buzzer / Boater
4. Power Supply
5. micro controller series
6. max 232
7. Red Led
8. Green Led
9. RF Transceiver

3.2. Working

First it takes image. Use of this model to detect the face, though unusual driving. Means the driver can safely drive the car.

Use simple method to detect the eye image by using edge detection. Do the smoothing on the eye image for perfect frame formation around the eye region. Store the eye frames. Compare the eye frames with the next frame.

When several frames are traced by camera and if in the consecutive fifth frame eye closure is detected then it is approved as fatigue is detected or tiredness is detected then the alert is given by controller.

In these systems the driver's eyes are continuously monitored by a camera, due to which we can detect fatigue state of driver.

Short sleeps or micro sleeps of driver can also be detected which are the main causes of accidents.

In addition micro sleeps that are short period of sleeps 2 to 3 seconds are good indicates of tired state.

Thus by continuously monitoring the eyes of the driver one can detect the sleeping state or mode of driver and timely warning is issued by vibrations or alarm system and is manually switched off.

Large number of road accidents occurs due to the driver drowsiness.

The main idea behind this project is to develop a tending system which can detect fatigue of the driver and issue a timely warning. This system will monitor the driver's eyes using camera.

So this project will be helpful in detecting driver fatigue in advance and will gave buzzer output in form of sound and seat belt vibration.

Table.1: Table captions should be placed above the table

Graphics	Top	In-between	Bottom
Tables	End	Last	First
Figures	Good	Similar	Very well

3.3. System diagram

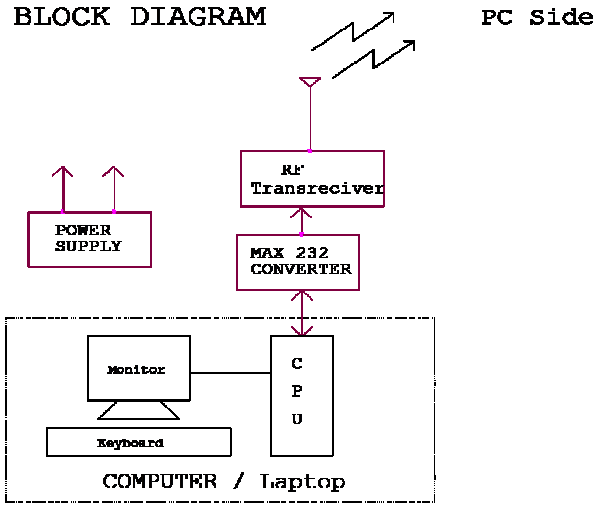

Fig.1: Block Diagram of Eye Tracking

As figure 1 contain power supply, RF transceiver and Max 232 converter. RF transceiver is use to transmit and receive the signal in the system which is further given to the MAX232 converter convert that signal into appropriate format hence by using computer or laptop we can easily use this input for generating output.

IV. ALGORITHM

1] Start
2] Take the image
3] Detect the face, though unusual driving.
4] Detect the eye image by using edge detection.
5] Calculation of criteria.
6] Eye closure is detected then it is approved as fatigue is Detected.
7] Alert is given by controller.

V. ADVANTAGES

[1] Component establishes interface with other drivers very easily.

[2] Life of the driver can be saved by locking the ignition system of the car.

[3] Traffic management can be maintained by reducing accidents and traffic jams can be avoided.

VI. DISADVANTAGES

Visual basic and other software programming language tools are not compatible with tablets as this program can run only in MS-window and compatible devices, pc requirement is must.

VII. APPLICATIONS

[1] Traffic management can be maintained by reducing accidents and traffic jams can be avoided.
[2] Used in locking the ignition system of the car.
[3] Hi-tech classroom.

VIII. CONCLUSION

This system will remove eye captured mode to detect or remove the tried state of driver and gives warning in half second and also built the performance and record of driver in form of graph. So this system will be helpful in remove driver fatigue state in advance and will give a warning or make alert output in form of sound and vibration.

Because of this system driver can be alert and road accidence can be less. There is a red & green signal in that systems because of that with the help of sound of the system the warning can be fastly get ten to the driver.

The red signal shows that driver is in sleeping mode. And green signal shows the driver is in waking mode.

By capturing the position of eyes using camera and using this Algorithm we can detect symptoms of driver tiredness early is very useful to avoid accidents.

REFERENCES

[1] World Journal of Engineering Research and Technology Wjert .Driver Aided System Using Fatigue Detection. , Madhumati Kavale, Supriya Kumbhar and Nikhil Lohar**,** Kajal Karbhal**.**
[2] *International Journal Of Innovative Research In Electrical, Instrumentation And Control Engineering, Issue 6, June 2016.* Eye Gaze Tracking and Eyes off the Road Detection for Traffic Safety on Raspberry Pi Harshada Dongare1, Sanjeevani Shah2 Student, Electronics and Telecommunication Engg. Skncoe, Pune, India2 Hod, Electronics and Telecommunication Engg. Skncoe, Pune, India.
[3] International Journal Technical Research Application, Issue 3 (May-June 2015), PP.Eye Tracking Based Driver Drowsiness Monitering And Warning System Mitharwal Surendra Singh L. Ashish M. Institute of Knowledge College of Engineering Pune, India.
[4] International Research of Engineering and Technologies 05 | May-2016 Advanced Driver Assistance for Vehicle Monitoring. Abhishek1, Sachin Choudhary2, Kiran Kumar K V4, Bharath Kumar H S5 Professor, Dept. of Ece Institute of Technology, Karnataka, India
[5] Ieee Journal of Biomedical and Health Information's, May 2015 Eye Tracking based Driver Fatigue Monitoring and Warning System Hardeep Singh M.E (E.P.D.T), E&EC Deptt.